

REMARKS

This amendment is submitted in response to the Office Action mailed June 5, 2002. Claims 1, 2, and 5-15 are pending in the application. Claims 1, 9, 10, and 12 have been amended and claims 3 and 4 have been cancelled without prejudice. Claim 15 has been added by this Amendment. Claims 1, 2, and 5-15 are now submitted to be in condition for allowance. The following remarks are respectfully submitted.

Objections to the Drawings

The drawings were objected to for not illustrating all features recited in claim 12. Claim 12 has been amended to remove elements not illustrated in the figures. Accordingly, Applicants respectfully request that the objections to the drawings be withdrawn.

Objections to the Specification

The Examiner objected to the title of the invention as being non-descriptive. The title has been amended to more clearly describe the invention. Applicants have further amended the specification to correct various typographical errors. Accordingly, Applicants respectfully request that the objections to the specification be withdrawn.

Objections to the Claims

The claims were objected to for lacking the introductory phrase "WE CLAIM:" The specification has been amended to include this phrase. Accordingly, Applicants respectfully request that the objections to the claims be withdrawn.

Claims Rejected Under 35 U.S.C. § 112

Claims 1-14 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claims 1, 9, 10 and 12 have been amended to address issues identified by the Examiner. Accordingly, Applicants respectfully request that the rejections of claims 1-14 under 35 U.S.C. § 112, second paragraph, be withdrawn.

Claims Rejected Under 35 U.S.C. § 102

Claims 1-11, 13 and 14 were rejected under 35 U.S.C. § 102(b) as being anticipated by either Great Britain Patent GB 2047104, U.S. Patent No. 6,227,698 to Muntener, U.S. Patent No. 4,918,665 to Herfeld, or U.S. Patent No. 4,883,363 to Pillon et al. Claim 1 is the only independent claim of this rejected group. As amended, claim 1 is directed to a homogenizer for homogenizing free-flowing substances comprising:

a rotor which is mounted for rotation in a first housing,
a drive device coupled to rotate the rotor,

a rotatable element coupled to the drive device which is mounted for rotation in the first housing and driven for rotation independently of the rotor, for homogenizing and/or transporting the free-flowing substance,

wherein the rotatable element is constructed as an impeller with a plurality of pump buckets.

Applicants submit that amended claim 1 is not taught or suggested by the cited references. Specifically, claim 1 has been amended to recite a rotatable element having a plurality of pump buckets. This limitation was previously recited in claim 3, now cancelled. Accordingly, Applicants submit that no new matter is added by this amendment. Contrary to the assertions of the Examiner, none of the cited references teach this element. In this regard, the pins in rows 31, 32 and 33 of GB 2047104 are described as having cylindrical cross sections (see page 3, lines 49-51). The non-cylindrical impact elements 15 (see FIG. 4) also do not have a "bucket" configuration. Muntener discloses shearing tools 8 described as having "pin-like, knife-like, or . . . paddle-like" configurations (see Muntener at col. 3, lines 36-41). Herfeld discloses elements 11A defined as "blades." Pillon et al. disclose a device having vertical teeth 5, 14 for shearing in-fed product disposed on a disk 12, not a plurality of pump buckets, as rejected in claim 1.

The specification describes rotatable element 6 as having "pump buckets 34 . . . designed in a known fashion in such a way that the liquid substance is transported with a relatively high pumping power" (see Application at page 8, lines 7-12). One objective of the present invention is to overcome a drawback of the prior art homogenizers in which the shearing effect and transporting effect of

the prior homogenizers are directly interlinked (see Application at page 2, lines 3-5). The shearing effect and transporting effect of prior homogenizers are interlinked because the shearing and transporting functions are accomplished by the same rotor-stator arrangement. To address this problem, the rotatable element of the present invention has pump buckets to provide "high pumping performance while the rotor essentially generates the shearing effect" (see application at page 4, lines 1-4). Accordingly, Applicants have distinguished the pump bucket configuration from the conventional rotor-stator configurations disclosed in the cited references. This distinction is further highlighted by the Doctrine of Claim Differentiation, wherein claims 3 and 4 (now cancelled) recite that the rotatable element is constructed with either pump buckets or stator and rotor blades, respectively.

For the reasons stated above, Applicants assert that claim 1 is now in condition for allowance. Accordingly, Applicants respectfully request that the rejection of claim 1 under 35 U.S.C. § 102(b) be withdrawn.

Claims 2 and 5-14 each depend from independent claim 1 and therefore should be in condition for allowance for at least the reason stated above for claim 1. Accordingly, Applicants respectfully request that the rejections of claims 2 and 5-14 be withdrawn.

Claims Rejected Under 35 U.S.C. § 103

Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Pillon et al. in view of U.S. Patent No. 5,253,937 to Scheimann et al.

Applicants note that claim 12 depends from claim 1 and respectfully traverse the rejection of claim 12 because Pillon et al. do not teach or suggest all elements of claim 12. Specifically, Pillon et al. do not teach a rotatable element having a plurality of pump buckets, as discussed above. The combination with Scheimann et al. does not cure this deficiency. Accordingly, Applicants respectfully request that the rejection of claim 12 under 35 U.S.C. § 103(a) be withdrawn.

New Claim

New claim 15 has been added by this amendment. Claim 15 ultimately depends from claim 1 and therefore should be in condition for allowance for at least the reasons stated above for claim 1. In addition, claim 15 recites that the shaft seal provided to seal the interior of the first housing of the homogenizer is a sliding ring seal. Support for this amendment can be found in the Application at page 10, lines 3-5. Accordingly, Applicants submit that no new matter has been added by this amendment. None of the references cited by the Examiner teach or suggest sliding ring seals as recited in claim 15. Accordingly, Applicants submit that claim 15 is in condition for allowance.

This application is respectfully submitted to be in complete condition for allowance. If there is any additional matter that may be resolved by telephone or fax, the Examiner is invited to contact the undersigned to expedite issuance of this application.

Attached hereto is a marked-up version of the changes made to the

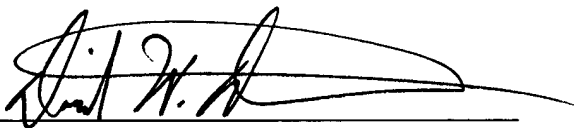
claims by the current amendment.

Applicants are of the opinion that an additional fee of \$ 980.00 is due as a result of this amendment, for the extension of time to file. The Commissioner may consider this to be a request for such and charge this and any necessary fees to Deposit Account 23-3000. If any additional charges or credits are necessary to complete this communication, please apply them to deposit account no. 23-3000.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

The title should now read as follows:

Apparatus for Homogenizing Free-Flowing Substances

IN THE SPECIFICATION:

Please replace the paragraph beginning at page 8, line 17, with the following rewritten paragraph:

To increase the homogenizing and/or dispersion effect of the homogenizer, there are several stator elements or rings on the housing 2 which extend inward into the interior 16 and form a stator 38; they are in multiple stages, in the implementation example in two stages. Inner stator elements are located between the blades 26 or 28, viewed in the radial direction, and additional stator elements are placed between the blades 28 and the pump buckets 34 of the rotatable element 6.

Please replace the paragraph beginning at page 9, line 1, with the following rewritten paragraph:

The drive device 8, with which the rotor 4 and the rotatable element 6 can be driven independently of each other, is explained in the following section on

the basis of Figures 1 and 3. The drive shafts 30, 36 can be driven with the help of gear wheels 40 and 42 attached to their end sections, toothed belts 44 and 46, gearing mechanisms 48, 50 and electric motors [50] 52, 54 at adjustable speeds in both directions, in such a way that the rotor 4 and the rotatable element 6 are rotating in the same or opposite directions. In addition, the rotor 4 or the rotatable element 6 can be stopped while the other part rotates. The gearing mechanisms 48, 50 and the electric motors 52, 54 can be arranged at offsets or rotated around longitudinal axes 56, 68.

Please replace the paragraph beginning at page 10, line 15, with the following rewritten paragraph:

The implementation example of a homogenizer in accordance with the invention which is partially shown in Figure 4 is in principle similar in design to the implementation example described above, so that to avoid repetition we refer in full to the above description and will describe only differences below. The rotor 4 is driven by means of the drive shaft 30, toothed belt 44 and gearing mechanism 48 and the drive motor 52. The rotatable element 2 is driven by means of the outer drive shaft 36, toothed belt 46, gearing mechanism 50 and drive motor 54 independent of the rotor 4. The rotatable element 2 has outer pump buckets 34 fastened to the base plate 32, which pass over into an upper ring wheel 82 which is directed radially upward, on which are formed blade or stator elements 84 which

extend axially in the direction of the base plate 24 in the manner of a stator; these elements are arranged between the pump buckets 34 and the blades 28, or between the blades 26 and 28, and increase the shearing effect. The stator elements 84 can rotate together with the rotatable element 2 and the pump [buckets] stator elements 34. Since the buckets 84 are formed in the manner of a conventional stator and are rotatable, one can also speak of a "dynamic stator."

Please replace the paragraph beginning at page 11, line 9, with the following rewritten paragraph:

The other implementation example, described on the basis of Figure 5, is also similar to the implementation examples already described, so that we refer to the descriptions above and will only describe differences. The rotor 4, which is driven by means of the drive shaft 30, has a number of fins 86 attached to the base plate 24 which are connected with a circular disk 88. Extending axially inwardly from the circular disk 88 are stator elements 90 formed in the manner of a stator, which can rotate around the longitudinal axis 18. The rotatable element 2, which is coupled with the drive shaft 36, has buckets 92 formed in the manner of a rotor, as well as outer pump buckets 94. The stator elements 90 are positioned between the [impeller] outer pump buckets 94 and the elements 92.

Please replace the paragraph beginning at page 11, line 20, with the

following rewritten paragraph:

Finally, with regard to the additional implementation example shown in Figure 6, we also refer to the above descriptions and will explain only the differences below. The rotor [6] 4, which is coupled with the drive shaft 30, is designed in the same way as the implementation example described above on the basis of Figure 5. The element 6 which can be rotated by means of the drive shaft 36 is constructed in the manner of a stator, and has stator elements 96 which extend axially from the base plate [24] 32.

Please insert the following paragraph after the last paragraph on page 12:

WE CLAIM:

In the Claims:

1. (Amended) A homogenizer for homogenizing free-flowing substances comprising:

a rotor which is mounted for rotation in a first housing,
a drive device coupled to rotate the rotor,
a rotatable element coupled to the drive device which is mounted for

rotation in the first housing and driven for rotation independently of the rotor, for homogenizing and/or transporting the [liquid] free-flowing substance,

wherein the rotatable element is constructed as an impeller with a plurality of pump buckets.

Claim 3 is cancelled.

Claim 4 is cancelled.

9. (Amended) The homogenizer of Claim 5, wherein at least one of the rotor and the rotatable element has a base plate which is coupled with the corresponding drive shaft [from which the blades extend axially], the rotational axes of the drive shafts are positioned essentially vertically in operation, and the drive shafts are each driven by one of a toothed belt V-belt and chain.

10. (Amended) The homogenizer of Claim 1, further comprising respective drive motors coupled to the rotor and the rotatable element, the drive motors being controlled such that the rotor and the rotatable element can be rotated at adjustable relative speeds in the same or opposite directions, or such that either the rotor or the rotatable element is driven while the other component stands still.

12. (Amended) The homogenizer of Claim 1, wherein the first housing has an

wherein the rotatable element is constructed as an impeller with a plurality of pump buckets.

Claim 3 is cancelled.

Claim 4 is cancelled.

9. (Amended) The homogenizer of Claim 5, wherein at least one of the rotor and the rotatable element has a base plate which is coupled with the corresponding drive shaft [from which the blades extend axially], the rotational axes of the drive shafts are positioned essentially vertically in operation, and the drive shafts are each driven by one of a toothed belt V-belt and chain.

10. (Amended) The homogenizer of Claim 1, further comprising respective drive motors coupled to the rotor and the rotatable element, the drive motors being controlled such that the rotor and the rotatable element can be rotated at adjustable relative speeds in the same or opposite directions, or such that either the rotor or the rotatable element is driven while the other component stands still.

12. (Amended) The homogenizer of Claim 1, wherein the first housing has an inlet opening through which the [liquid material] free-flowing substance can flow axially from a container into the interior of the first housing, [and an outlet opening

through which the homogenized liquid substance flows essentially radially and/or tangentially out of the housing,] and a [that there are two] return line[s] which communicates with the [outlet opening of the] housing, through which the liquid substance can be conveyed back to various locations in the container depending on the position of a control valve.

Add new claim 15.